REMARKS/ARGUMENTS

Claims 1-15, 18-22, 29-35, 40 and 41 remain in this application.

The Examiner has objected to the drawings. Applicants have added figure 14 to show the N objects and the locating and controlling means. The specification has been amended accordingly. Formal drawings will be provided when the application is allowed.

The Examiner has rejected Claims 1, 10 and 12 under 35 U.S.C. 112 under both paragraphs one and two. The Examiner states that the limitation "N objects unaware of their respective position and orientation" was not disclosed in the specification as originally filed. Applicants respectfully traverse this rejection. This limitation was added in the amendment filed on November 21, 2007. There have been several actions by the Examiner since such time and this limitation was never questioned. As was stated in the Amendment filed on November 21, 2007, antecedent support for this limitation is found on page 11, lines 16 and 17. The specification specifically states individual vehicles possess no model of their own position. Rather, a vehicle transmits its position and orientation to the central processor by successively flashing LEDs mounted upon the vehicle's chassis. The central processor computes the position and orientation of the vehicle from the measured positions of these LEDs. Beginning on page 11, line 9, the specification states within each update cycle, each vehicle's current location and orientation are detected by the central processor; the central processor then specifies for each vehicle, a velocity for each of the vehicle's drive wheels. Thus there is clear support for the limitation that the N objects unaware of their respective position and orientation. It is the central processor that knows all, and controls all.

The Examiner has also questioned the limitation "communicating movement commands to the objects to control the objects' movement" of Claim 1. It is respectfully submitted that

antecedent support for this limitation is found on page 11, lines 6-21. Specifically, therein the specification states within each update cycle, each vehicle's current location and orientation are detected by the central processor; the central processor then specifies, for each vehicle, a velocity for each of the vehicle's drive wheels. Each cycle is temporarily divided into successive time slices; each time slice is assigned to a single vehicle, during which all communication between the vehicle and central processor takes place. The central processor computes the position and orientation of the vehicle from the measured positions of these LEDs. Accordingly, there is antecedent support in the originally filed specification for this limitation.

The Examiner has rejected Claims 1-12, 14, 18-20 and 29 as being unpatentable over Hara in view of Faghri. Applicants respectfully traverse this rejection.

Referring to Hara, there is disclosed a group robot system, and sensing robots and base station used therefor. Hara teaches a group robot system in which a number of robots operate collectively. See column 1, lines 8-10. Hara teaches the group robot the system consists of a base station, a plurality of fluttering sensing robots and a plurality of fluttering pheromone robots, as shown in figure 1. Figure 7 shows the relationship between the position and hierarchical structure in communication between each of the sensing robots and between the sensing robot and the base station in the group robot system. See column 12, lines 54-64.

Claim 1 of applicants has the limitation that "each of the N vehicles unaware of their respective position and orientation and not in communication with each other". Hara does not teach or suggest this limitation. Hara requires that the plurality of robots have a hierarchical structure and are in communication with each other. In fact, because Hara requires that the plurality of robots are in communication with each other, Hara teaches away from applicants' claimed invention where the vehicles are not in communication with each other.

Hara teaches that the sensing robots are essentially autonomous, that is, not guided by the base station. The sensing robots are preprogrammed to move essentially concentrically about the base station. Thus, the sensing robots have their movement essentially only constrained by staying within a predetermined distance from the base station, and moving concentrically. Hara teaches that when a sensing robot detects an object, position information and the like are transmitted to the base station. Based on the transmitted information, the base station starts free movement toward the object. As the base station moves, sensing robots positioned approximately concentrically also move toward the object. A sensing robot closer to the base station has higher spatial resolution. Therefore, as the base station comes closer to the object, accuracy of position detection for detecting the object or sensing information related to the size of the object that is to be transmitted to be the base station, becomes higher. See column 14, lines 1-14.

Besides the fact that each of the robots are aware of their respective position and orientation in communication with each other, as explained above, the base station is not communicating movement commands to the objects to control the objects movement. The robots, on their own, detect the position of the base station and where they are relative to the base station, and maintain the desired position from the base station based on their own commands determined from knowing where the base station is located relative to them, and not commands from the base station.

Referring to Faghri, there is disclosed a computer implemented system and method for simulating motor vehicle and bicycle traffic. Since Faghri is completely directed to a computer implemented system and method, there are absolutely no physical objects, as found in amended Claim 1. It is respectfully submitted that Faghri has nothing to do with applicants' claimed invention, as amended. A computer simulation of motor vehicles has nothing to do with the manipulation or control of physical objects.

Furthermore, Claim 1 of applicants has the limitation that each of the N objects is unaware of their respective position and orientation and not in communication with each other. Faghri specifically teaches that the simulation uses a motor vehicle following model. Specifically, in car following situations, the behavior of vehicles as they follow one another is applied. The response of a driver seems to be affected by the relative speed of his car and the one ahead. Thus, the relative speed corresponds to the stimulus in the function. The driver sensitivity is inversely proportional to the distance headway. The model in Faghri uses the equation on column 8, line 15. See column 7, line 65-column 8, line 30. Accordingly, not only does Faghri fail to teach or suggest, and really has nothing at all to do with physical objects, but Faghri also does not teach or suggest each of the N objects unaware of their respective position and orientation and not in communication with each other, since the car following model requires a given vehicle being in communication with a vehicle immediately ahead of it.

It is respectfully submitted that since Faghri is a self-contained simulation, with no physical objects whatsoever, in fact, every object in the model of Faghri knows it's respective position and orientation and is in communication with each other because they all are part of the same software code. Thus, the computer which runs the software that contains the model is the only physical object and has full knowledge of all the data associated with the program in its memory. Furthermore, in column 4, lines 57 and 58, Faghri specifically teaches that these "vehicles interact with other vehicles". To interact requires these vehicles to be aware of each other and of their respective position and orientation. Thus, even Faghri, does not teach the N objects are unaware of their respective position and orientation and not in communication with each other, as found in applicants' claimed invention.

The Examiner is essentially taking the position that the simulation taught by Faghri could somehow or other be modified to receive outside data which would replace the simulated entities of the model, and instead control the robots of Hara, in the same way as claimed by applicants.

However, it is respectfully submitted this is an enormous, let alone probably impossible, leap to make. There is no capability in the model by Faghri how to control an object, such as an actual motor or wheels or any type of mechanism that moves a physical object. For instance, in applicants' preferred embodiment, for enablement purposes, applicants teach that turning is achieved by differential steering, whereby vehicle rotational rate is dictated by the difference in the velocity of the wheels. See column 16, lines 18-20. Faghri does not even consider such a capability (and does not need to), and Hara certainly does not do this because the base station does not specifically give motion commands to the robots.

There is no teaching or suggestion to combine these references. Each reference is totally distinct and has a different purpose and solves a different problem from the other. There must be some teaching or suggestion to combine these references, and here there is none.

Furthermore, to combine these references would require a total reengineering, significant research and design to somehow or other take the simulation of Hara and convert it into operating real-world physical objects. In addition, the system taught by Hara also has to be totally redesigned for the base station to be able to give motion commands to the robots, and the robots would not be able to operate by knowing where each other are located. This material redesign and redevelopment only supports the finding of nonobviousness.

Furthermore, it must be stressed that the only reason that the Examiner is combining these two references, is because of hindsight. The Examiner is using the limitations of applicants' claims as a roadmap, to find the different limitations in disparate references, and supposedly having found them, concluding that applicants' claimed invention is arrived at. This is not patent law. Hara has no need of a simulator (Faghri) and Faghri has no need of search robots (Hara).

Moreover, it is respectfully submitted that because Faghri deals only with a simulation, it is non-analogous art and cannot be cited against applicants' claimed invention.

The Examiner is also reminded that teachings cannot be taken out of the context in which they are found. The context of Hara is the robots must be able to communicate with each other to perform their primary purpose. The context of Faghri is a computer simulation.

With respect to the "Response to Arguments" section of the Office Action beginning at page 12, paragraph 13, the Examiner draws applicants' attention to Faghri, which the Examiner states shows each of the N objects unaware of the respective position and orientation and not in communication with each other, and refers to the various figures. It is respectfully submitted, as explained above, that Faghri by definition since it is a computer program and creates a virtual world, not a real world with physical objects, requires the computer program to know where every aspect of the virtual is located and its orientation at every moment. This is how the virtual world is created. It is respectfully submitted the Examiner cannot ignore this simple and very clear fact.

In paragraph 13, the Examiner goes on and points out that Hara serves various aspects of physical objects. The Examiner then states that applicant is arguing against references individually and thus applicants argument is ineffective since nonobviousness cannot be shown by attacking references individually where the rejections are based on combinations or references. In response, it is respectfully submitted that applicants are arguing the law. Specifically, the Examiner cannot take the teachings of the various references the Examiner relies upon to arrive at applicants' claimed invention out of the context in which they are found. Applicants' argument is explaining the specific contexts of the applied art or record, and further, how they are unrelated and how inappropriate it is to combine their teachings. Furthermore, in regard to paragraph 13 of the Office Action, it is respectfully submitted that the Examiner

actually makes applicants' case. The Examiner is simply citing individual limitations in the applied art of record with no basis to combine them. 99% of all patents are based on known elements that are combined in a unique and nonobvious way. The simple existence of these elements separately does not mean that applicants' claimed invention is arrived at. It is respectfully submitted that all the Examiner has done, is found the different elements of applicants' claimed invention in different references, but by law, this is not sufficient to arrive at applicants' claimed invention.

In regard at paragraph 14, the Examiner directs applicants' attention to MPEP Section 2143 which states the prior art must suggest the desirability of the claimed invention. However, nowhere does the Examiner actually explain how the prior art suggests the desirability of applicants' claimed invention. In fact, there is no teaching or suggestion whatsoever in the applied art of record of the desirability of applicants' claimed invention.

The Examiner goes on and draws applicants' attention to MPEP Section 904.02 which indicates the proper classification search guideline for the prior art reference Hara is directed to robot control with applicants' application.. However, Faghri, has nothing at all to do with robot control but rather with simulated computer systems. The test regarding non-analogous art is completely contrary to what the examiner states in paragraph 14. By law, two criteria have evolved for determining whether prior art is analogous: (1) whether the art is from the same field of endeavor, and (2) if the reference is not within the field of the inventors' endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. In determining reasonable pertinence, the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. In re Clay, 23 USPQ 2nd 1058 (Fed. Cir. 1992); In re Oetiker, 24 USPQ 2nd 1443 (Fed. Cir. 1992).

As is clear, Faghri is not in the same field of endeavor as applicants' field. The problem with which Faghri is involved regarding software is completely unrelated to the problem with which applicants' are involved in regard to physical objects. Accordingly, Faghri is non-analogous art to applicants' claimed invention.

The Examiner then directs applicants' attention to MPEP Section 2143.02 which states a reasonable expectation of success is required for determination of obviousness. Again, it is respectfully submitted the Examiner simply makes a bare statement, without any explanation as to why it would be reasonably expected to combine the applied art of record to successfully arrive at applicants' claimed invention. In fact, applicants have clearly explained why a virtual software system has no expectation whatsoever of being combined with a physical system, such as that taught by Hara.

The Examiner then cites MPEP Section 2143.03 which states that all claim limitations need to be addressed, and the Examiner then states that all claim limitations have been addressed. However, it is respectfully submitted that the applied art of record does not teach or suggest an object is unaware of its position and orientation and not in communication with each other.

The Examiner states in response to applicants' argument that there is no suggestion to combine the references, the Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention that there is some teaching, suggestion or motivation to do so found either in the references themselves or in the general knowledge available to one skilled in the art. It is respectfully submitted that the Examiner while once again stating the law, has not provided such a teaching, suggestion or motivation in the references themselves nor the general knowledge available to one of ordinary skill in the art.

In regard to section 8 on page 15, the Examiner states that in response to applicants' argument that the reference is not physically combinable, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference, nor is it that the claimed invention must be expressly suggested in any one or all the references. Rather, the test is what the combined teachings of the references could have suggested to those of ordinary skill in the art. In response, applicants respectfully submit that the Examiner has again made a bare statement, without any explanation to support the Examiner's statement. There is no explanation what the combined teachings of the references would have suggested to that of one ordinary skill in the art to arrive at applicants' claimed invention. In contrast, applicants have very carefully explained why one of ordinary skill in the art would never consider a software simulation program and combine it with the teachings of Hara. Again, since the software simulation program has no capability whatsoever of interfacing with data transmitted by an object to process it for locating and controlling the N objects, as found in applicants' claimed invention.

In regard to paragraph 9 on page 15, the Examiner states that in response to applicants' argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a construction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicants' disclosure, such a reconstruction is proper. It is respectfully submitted that again the Examiner does not explain the statement. In contrast, applicants have very carefully explained why the only reason the Examiner is combining the applied art of record, is from hindsight, and has gone through and explained why there are no teachings or suggestions to negate the finding of hindsight. Accordingly, it is respectfully submitted that applicants' claimed invention is patentable.

Accordingly, Faghri in view of Hara does not teach or suggest the limitation in Claim 1 of "N physical objects . . . each of the N is objects unaware of their respective position and orientation and not in communication with each other"; and Claim 1 is patentable.

Claims 2-9 and 29 are dependent to parent Claim 1 and are patentable for the reasons Claim 1 is patentable.

Claim 10 is patentable for the reasons Claim 1 is patentable. Claim 11 is dependent to parent Claim 10 and is patentable for the reasons Claim 10 is patentable.

Claim 12 is patentable for the reasons Claim 1 is patentable. Furthermore, the LEDs of Hara are for visible illumination of other objects (e.g. detecting an intruding human) not for sensing the location of robots. See column 39, lines 20-27 and column 41, lines 30-45.

Claim 14 is patentable for the reasons Claim 1 and Claim 12 are patentable.

Claim 18 is patentable for the reasons Claim 1 is patentable and Claim 12 is patentable.

Claims 19 and 20 are dependent to parent Claim 18 and are patentable for the reasons Claim 18 is patentable.

The Examiner has rejected Claims 13, 15, 22 and 30-35 as being unpatentable over Hara in view of Faghri and further in view of Storlie. Applicants respectfully traverse this rejection.

Referring to Storlie, there is disclosed a media edge sensor utilizing a laser beam scanner. Storlie teaches a laser printer 10 which includes a laser scanner mechanism 12. A media sheet 18 (paper) is propelled along imprinting pathway 16 by rollers 20 and 22. A scanned beam 23 from

laser scanner mechanism 12 contains modulation information for imprinting images on paper 18. See column 2, lines 54-63.

Storlie teaches that optical sensors 40 and 42 are positioned beneath media sheet 18 when it is positioned and in printing path 16. Optical sensors 40 and 42 are only partially shaded by sheet 18 and provide signals indicative of the incidence of beams 36 and 38, respectively, to a microprocessor 44. In essence, each of optical sensors 40 and 42 provide a high output to microprocessor 44 during the time the beams 36 and 38 are respectively incident thereon. By measuring the pulse lengths of the outputs with optical sensors 40 and 42, microprocessor 44 can determine the width of a media sheet 18 and whether it is off set from the center line of imprinting path 16. See column 3, lines 15-28.

Claim 13 has the limitation of "a planar element on which the N objects are disposed, and wherein the sensing means includes at least two 1-D sensors that sense the light emitted from the edge of the planar element on which the objects are disposed". It is respectfully submitted by applicants that the only planar element that Storlie teaches is a piece of paper. There is no teaching or suggestion that anything is disposed on this piece of paper. Storlie is teaching a scanner and specifically how to impart an image onto the piece of paper. The light that is taught by Storlie is not emitted from the edge of the planar element, but from a laser 26 that is separate and apart from the piece of paper, as is easily seen in figure 2 and 3. This light is used for an alignment of the piece of paper, that is the alignment of the planar element. Accordingly, Storlie does not teach a planar element upon which the objects are disposed, nor does Storlie teach to sense light emitted from the edge of the planer element. Furthermore, Storlie does not teach or suggest each object having an emitter which emits a light, each of the N objects unaware of their respective position and orientation and not in communication with each other, as found in Claim 12. Accordingly, Storlie does not add anything to the teachings of Faghri and Storlie in relevant

part to arrive at Claim 12 of applicants. Claim 13 is dependent to parent Claim 12 and is patentable for the reasons Claim 12 is patentable, as well is for the reasons explained above.

Claim 14 is patentable for the reasons Claim 12 is patentable. Claim 15 is dependent to parent Claim 14 and is patentable for the reasons Claim 14 and 13 are patentable.

Claim 18 is patentable for the reasons Claim 12 is patentable. Claim 22 is dependent to parent Claim 18 and is patentable for the reasons Claim 13 and Claim 18 are patentable.

Claims 30 and 31 are dependent to Claim 22 and are patentable for the reasons Claim 22 are patentable.

Claims 32 and 33 are dependent to parent Claim 13 and are patentable for the reasons Claim 13 is patentable.

Claims 34 and 35 are dependent to parent Claim 15 and are patentable for the reasons Claim 15 is patentable.

The Examiner has rejected Claim 21 as being unpatentable over Hara in view of Faghri and further in view of Kanayama. Applicants respectfully traverse this rejection. The only reason the Examiner has cited Kanayama is supposedly because it teaches vehicles capable of holonomic motion. However, Kanayama does not add anything to the teachings of Faghri and Hara to arrive at the limitations of Claim 18. Claim 21 is dependent to parent Claim 18 and is patentable for the reasons Claim 18 is patentable.

In view of the foregoing amendments and remarks, it is respectfully requested that the outstanding rejections and objections to this application be reconsidered and withdrawn, and Claims 1-15, 18-22, 29-35, 40 and 41, now in this application be allowed.

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